

HW: p. 99: 1, 2

p. 101 (practice E): 3, 4

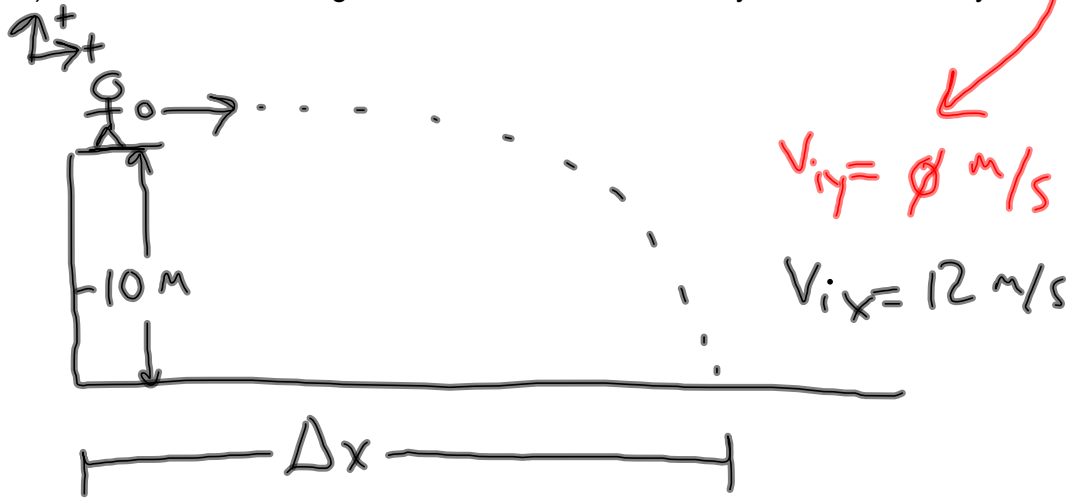
TEST Tuesday 2/28

Projectile Motion Practice Problems 2.21.12 Honors Physics

A man stands on a balcony that is 10 m high and throws a ball horizontally with a velocity of 12 m/s.

a) How long does it take for the ball to hit the ground?

b) How far does the ball go in the x-direction from directly below the balcony?



$$a) \Delta y = \cancel{v_{iy}} t + \frac{1}{2} a_g t^2$$

$$t = \sqrt{\frac{2\Delta y}{a_g}}$$

$$= \sqrt{\frac{2(-10\text{ m})}{(-9.8\text{ m/s}^2)}}$$

$$= 1.43 \text{ s}$$

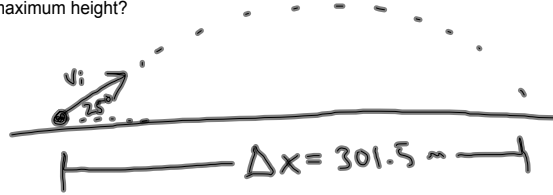
$$b) \Delta x = v_{ix} t$$

$$= (12 \text{ m/s})(1.43 \text{ s})$$

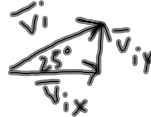
$$= 17.2 \text{ m}$$

Projectile Motion Practice Problems 2.21.12 Honors Physics

A golfer hits a golf ball at an angle of 25.0 degrees to the ground with an initial velocity of 62.1 m/s. If the golf ball covers a horizontal distance of 301.5 m, what is the ball's maximum height?



1) find v_{ix} and v_{iy}



$$v_{ix} = v_i \cos(25^\circ) = 56.3 \text{ m/s}$$

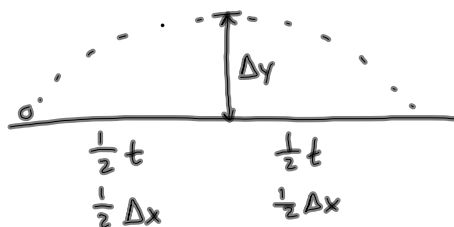
$$v_{iy} = v_i \sin(25^\circ) = 26.2 \text{ m/s}$$

2) find time it takes to travel Δx

$$\Delta x = v_{ix} t$$

$$t = \frac{\Delta x}{v_{ix}} = \frac{301.5 \text{ m}}{56.3 \text{ m/s}} = 5.36 \text{ s}$$

* For symmetric problems (object lands at same height it started), highest point occurs at $\frac{1}{2}$ time and $\frac{1}{2} \Delta x$.



3) find $\Delta y \rightarrow$ at max height, $v_{fy} = 0 \text{ m/s}!$

$$v_{fy}^2 = v_{iy}^2 + 2a_y \Delta y$$

$$\Delta y = \frac{-v_{iy}^2}{2a_y}$$

$$= \frac{-(26.3 \text{ m/s})^2}{2(-9.8 \text{ m/s}^2)}$$

$$= 35.3 \text{ m}$$